

Rejections under 35 U.S.C. §112

Claims 16-18 stand rejected under 35 U.S.C. §112, second paragraph, for lack of antecedent basis for “said adhesive”.

Applicants have amended claim 16 to address this concern, and therefore respectfully request withdrawal of this rejection.

Rejections under 35 U.S.C. §102

Claims 1-11, 14-16, 19-20, 22 and 25 stand rejected under 35 U.S.C. §102 as anticipated by Kobayashi et al. (U.S. Patent No. 5,236,784). This rejection, to the extent that it might be considered pertinent to the amended claims presented herewith, is respectfully traversed. It is well settled that there is no anticipation unless (1) all the same elements are (2) found in exactly the same situation and (3) are united in the same way to (4) perform the identical function. As added and previously presented, Applicant's independent claims 23 and 26 recite elements that are not found in the Kobayashi et al. reference. Rather, there are significant patentable differences between applicant's recited invention and Kobayashi et al.

As presented, independent claims 23 and 26 each recite a tubular laminate including a lubricious plastic material (load bearing layer) bonded to a substrate. In addition, this tubular laminate is disposed in concentric, in-situ-molded relationship with a molded polymeric (e.g., thermosetting or thermoplastic resin, per claim 26) roller. Applicants believe these characteristics were implicit in the subject claims as originally presented, by virtue, for example, of previously presented claims 2, 23 and 25, such that no new search is required and no new matter has been added.

Claim 26 also recites that the substrate has a greater tensile strength than the inner lubricious layer, and that the outer roller is fabricated from a material having a lower melting point than that of the substrate. These characteristics were also implicit in the subject claims as originally presented, by virtue, for example, of previously presented claims 11-13, which recite a metallic substrate, and by the specification, which states that ‘the substrate... may be fabricated

from metals,... or from plastics, ceramics or composites utilizing glass or carbon fibers' (page 9, lines 6-8). The specification also supports the melting point characteristic, stating that the '[l]oad bearing layer... may... comprise... temperature tolerant polymer systems containing high melt temperature organic polymers' (page 9, line 16), and that 'both the load bearing layer... and substrate... must be capable of withstanding temperatures typically associated with injection molding the member' (page 10, lines 1-3). As such, no new search is required and no new matter has been added. These recitations thus define a structure which is clearly distinct from that disclosed in Kobayashi et al.

Rather than using a laminate, Kobayashi et al. simply mold a lubricious material 3 directly onto the inner surface of a pre-formed cylindrical holder 1. The term 'laminate' is used herein in its conventional sense, namely, to refer to a structure composed of dissimilar layers bonded and compressed together, e.g., by application of pressure normal to the layers, into a thin sheet. This usage is consistent with the various conventional dictionary definitions of 'laminate[d]' as: 'to... compress into a thin plate or sheet... by uniting several layers'; and 'composed of layers bonded together'. (American Heritage Dictionary of the English Language, New College Edition, 1976.) Kobayashi et al. do not disclose layers of material compressed into a sheet.

The present invention, on the other hand, is formed as a lamination, i.e., by the application of heat and pressure to discrete layers. The resulting laminate may then be formed into a tube as claimed. In this regard, Applicants submit that the structural distinctions between the claimed lamination and the Kobayashi et al. molded material 3 would be easily discernable by one skilled in the art, such as upon examination of the grain structure of the instant invention, which would reveal that Applicants' lubricious layer had been subjected to compressive forces predominantly normal to the plane of the substrate.

Advantageously, the claimed approach of laminating the lubricious layer to a substrate, e.g., prior to forming the laminate into the desired tubular configuration, generally forms a bond that is superior to that provided by simply molding a plastic bearing material onto a preformed cylinder as taught by Kobayashi et al.

In addition, and alternatively, Kobayashi et al. fail to disclose a molded polymeric roller, and furthermore, fail to teach that their combination of lubricious layer/substrate are disposed in a concentric, in-situ-molded relationship therewith. Rather, Kobayashi et al. merely disclose that their combination of material 3 and holder 1 may be press-fit into a housing 22, 32. Kobayashi et al.'s housings are not polymeric, and are not disclosed as being rollers, but simply appear to be flanges for rigidly fastening their bearings to ground.

Kobayashi et al. fail to disclose inner, intermediary, and outer layers, in which the intermediary (substrate) layer has greater tensile strength than the inner layer, and in which the outer layer (roller) is fabricated from a material selected from thermosetting or thermoplastic resins having a melting point below that of the intermediary layer. They also fail to disclose a bonding layer between the lubricious layer and the substrate, as recited in the instant claim 5.

Accordingly, for each of the aforementioned reasons, all the elements of the subject invention are not found in exactly the same situation in Kobayashi et al., nor are they united to perform the identical function. As such, Kobayashi et al. do not anticipate the subject invention as set forth in the independent claims. The dependent claims are patentable for the same reasons as the independent claims, as well for their additional characteristics.

Obviousness

Moreover, as recited, claims 23 and 26 are believed to set forth non-obvious subject matter over Kobayashi, et al., viewed independently or combined with any other document of record. There is no motivation to substitute the claimed lamination for the Kobayashi, et al. molded construction. Moreover, there is no further suggestion to mold the laminate in-situ into a roller to form a unitary roller and self-lubricating bearing having at least three discrete layers as claimed.

Kobayashi, et al. fail to recognize or suggest that the bond between their molded bearing material 3 and their cylindrical holder 1 may be improved by lamination. Rather, their teachings, in light of conventional wisdom, tend to indicate that the opposite is true. Namely, one skilled in the art would likely conclude that the Kobayashi, et al. bearing material 3 would crack, buckle or otherwise fail if applied to a flat holder and subsequently bent into the desired cylindrical configuration. For this reason, the construction of Kobayashi et al. should be viewed as teaching

away from the present invention.

For the above stated reasons, independent claims 23 and 26 are believed patentable over the art of record. The dependent claims are believed allowable for the same reasons as the independent claims from which they depend, as well as for their own additional limitations.

CONCLUSION

This application is now believed to be in condition for allowance, and such action at an early date is respectfully requested. However, if the Examiner believes there are any remaining issues, Applicant's undersigned representative respectfully requests a telephone call to discuss the case.

Respectfully submitted,



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